Eduard Strasburger.

JAMES ELLIS HUMPHREY.

WITH PORTRAIT—PLATE XXXI.

No name has been more familiar to botanists during the past fifteen years and no work has attracted greater attention or contributed more to the progress of our science than that of Eduard Strasburger. Therefore it has been thought that American botanists may be interested in a brief sketch of the man by way of supplement to what they already know of his work. The time is yet, we trust, far distant when any complete account of his life and work will be possible. But it seems legitimate to recognize the interest which naturally attaches to the personality and surroundings of every leader of thought. The following pages are simply the record of the permanent impressions remaining to a student after several months of daily intercourse, begun with no knowledge of the man but such as may be gained from his published work.

Eduard Strasburger is a native of Russian Poland, and has just completed his fiftieth year. He is, therefore, in the prime of his powers. He was educated at Warsaw and in Germany, and showed such promise as a young man that he was called at the age of twenty-five to the university at Jena. There he remained until 1881, when he accepted a call to Bonn as the successor of Hanstein; and none of the calls since received has tempted him from this congenial post. Later he was given the title "Geheimer Regierungsrath," the official distinction which the Prussian government confers upon its citizens of profound scholarship or other great attainments.

The results of his researches during the past twenty-five years are recorded in about as many published papers and volumes, familiar to botanists everywhere. In looking over the chronological list one is struck by the homogeneity of the work, and a little examination affords striking proof of that development of one research from a previous one, so characteristic of the greatest investigators. Entering upon a field which had shortly before been shown by the path-breaking work of Hofmeister to be so full of interest and far-reaching significance, the reproduction of the gymnosperms, he was naturally led to the comparative study of the angiosperms

also, and, one question leading to another, deeper and deeper into the investigation of the processes involved in the reproduction of the flowering plants, and of their significance. These studies naturally and early led to the investigation of the cell-contents, and especially of the nucleus, whose fundamental importance in the activity of the cell becomes so quickly apparent to the student. And it is perhaps through his work upon the indirect division of the nucleus that his name is most widely known. Prof. Strasburger himself states that his attention was first attracted to the karyokinetic figures by their conspicuousness in the endosperm of certain Coniferæ, and their superficial resemblance to the figures formed about the poles of a magnet. Studies of the cell contents inevitably brought up also questions as to the structure and growth of its wall. Apart from the two related lines of research just indicated, his chief work has been that which has resulted in his classic volume on the structure and functions of the vascular bundles in plants, which is also the bulkiest of his publications; so that he always refers to it in conversation as "Mein grosses Buch."

Just outside the corporate limits of Bonn, in the suburb of Poppelsdorf, stands the "Poppelsdorfer Schloss," up to the beginning of the present century a summer palace of the Archbishop-Electors of Cologne. It is a huge square building of two stories, about a central circular court, and is occupied by the Natural History department of the university, containing also the residence of the professor of botany. The botanical establishment occupies the entire upper floor of the southeasterly side of the square, and more than half of that of the northeasterly or front side. The fact that the building was erected in the first half of the last century, and for quite another use, will explain why it is poorly adapted for laboratory purposes. Yet, since the windows are large, and one finds abundant room and all necessary apparatus, he has no reason for complaint. The Botanical Institute includes a lecture room, well supplied with wall charts and diagrams, a laboratory for elementary and one for advanced students, and private rooms for the professor extraordinarius, Prof. Schimper, and for the assistant, besides storage room for apparatus, reagents and alcoholic material.

Prof. Strasburger devotes the two rooms of his residence which adjoin the institute to his own work, one serving as

library, the other as laboratory. These rooms are simply furnished, but their contents show that their occupant denies himself nothing that can really aid his work; and their scrupulous neatness and orderliness mark him as a careful and systematic man. Everything has its place and is to be found there when not in use. The library is very complete in modern botanical literature, and the space required for the alphabetical classification of the pamphlets, chiefly authors' reprints, is calculated to impress one with the volume of the literature of botany. Perhaps nothing serves to give a better idea of the rate at which this volume is increasing than a glance through the undistributed accumulation of two or three months on a shelf here.

The principal windows of the professor's residence and of the laboratories overlook the old palace garden, which has been the botanic garden since the foundation of the university in 1818. This is well laid out and well stocked. The out-of-door part has thus far received the chief attention of Prof. Strasburger, who is *ex officio* its director. This consists of an open level plot, laid out in beds for the systematic display of the vascular plants, and bordered at one end by a small pond which is formed by the widening of a part of the old palace moat and gives suitable ground for aquatics and swamp plants. On each side of the "system" lie the two parts of the arboretum, which contains many large and fine trees, including not a few American species. I noted large and flourishing specimens of *Quercus rubra*, *Juglans nigra*, and *Liriodendron tulipifera*, among others; while the blooming of our red maple was almost the first tangible evidence that the dreary drizzle that passes for winter in the Rhine valley was giving place to spring. The garden is rich in conifers, as the inspector, Herr Beissner, is a leading authority on this group. One of the oldest and most striking of them is a beautiful cedar of Lebanon, which is quite hardy there. There are also sections for officinal plants and poisonous plants, and a biological section where one finds grouped together in one bed plants which have solved a given biological problem in a similar way, without regard to natural relationships. This section was laid out under the present director and was one of the first of its kind in Germany. Most gardens now give more or less attention to such an arrangement, whose value is too evident to need emphasis. The

greenhouses, though partly old and in poor condition, contain some interesting things. Strikingly good are some large aroids and cycads and two tubs of splendid plants of *Strelitzia Reginæ* that produce every spring thirty or forty flower-stalks, and, after artificial pollination, develop good seeds. The palm-house and *Victoria*-house are new and good, and there is always something interesting to be seen in the propagation houses.

So much for the place where his work is done. Personally Prof. Strasburger is spare in figure and above the medium height, but his devotion to the microscope has given to his shoulders the student's stoop in a marked degree. His serious face and deep-set penetrating eyes can light up most pleasantly, as at the moment when the accompanying excellent likeness was taken.

In the lecture room he speaks very distinctly and earnestly, and presents his subject in clear and attractive fashion. He throws his whole thought and energy into the matter in hand, often showing deep feeling, and impressing the most careless hearer with his own profound belief in the interest and importance of what he presents. A lecture of three quarters of an hour is thus often very exhausting, but it cannot be doubted that its influence on the audience is far more real and lasting than that of a speaker of less enthusiastic temperament. In the laboratory the same qualities are prominent. His real interest in the work of each student, hearty appreciation of good work, and pressing curiosity for new facts stimulate all to their best efforts. The earnest student does not require much time to discover that no books, no piece of apparatus, no plant in the whole establishment, which can facilitate his work will be withheld. Should he feel hesitancy in asking often for apparatus which is private property, or in mutilating a rare plant, he is met by the question: "What is it here for?" This geniality and generosity in the interest of his science is thoroughly characteristic of Prof. Strasburger. Earnestness is the sure passport to his fullest aid and sympathy, and is assumed in every new comer until he has shown the contrary.

In his private work he is eager, persistent, indefatigable. Looking at a subject from every side, following up every clue, welcoming evidence from every source, and with a really extraordinary capacity for accomplishing results, one who

knew only the man could prophesy the quality of his work. One recognizes qualities of the ideal investigator in his zeal for the truth, no matter whose theories suffer, his openness to conviction, and his freedom from petty jealousy. He has pronounced views on disputed questions, and decided opinions of the work of others; yet one soon comes to feel that there is none of his views that cannot instantly be given up, and none of his opinions that cannot be modified when the accumulation of evidence shows it to be necessary. If he sifts evidence most critically and demands that it be ample, one feels so much the more confidence in his conclusions.

His quick, nervous manner is in marked contrast to the usual phlegmatic calmness of the native German, and is sometimes brusque to the verge of abruptness. But one quickly learns that this is but the expression of his intense earnestness and concentration upon the subject in mind, to the exclusion of all non-essentials. Finally, one's admiration daily increases as his marvelous grasp of the whole field of morphology and physiology is brought out by the discussion of the problems constantly arising in the laboratory. One recognizes a growing consciousness of the presence of a master mind, and a growing delight in contact with it. It is the possibility of the free development of such minds and of the fruition in them of the true scientific spirit in an atmosphere of complete "Lehrfreiheit und Lernfreiheit" that constitutes the chief glory of the German university.

Weymouth Heights, Mass.